ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

DRAFT
Proposed Action Memorandum
for the
771/774 Groundwater Collection System

Rocky Flats Environmental Technology Site
10808 Highway 93
Golden, CO 80403-8200

October 29, 2003

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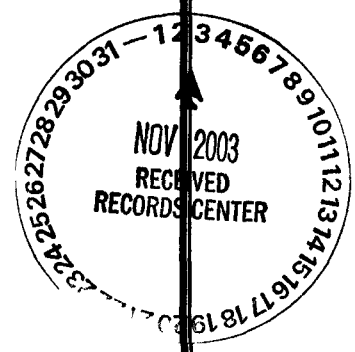

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ACRONYMS

ALF	Action Level Framework
APEN	Air Pollution Emission Notice
ARAR	Applicable or Relevant and Appropriate Requirement
BMP	Best Management Practice
CCR	Colorado Code of Regulations
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm/sec	Centimeters/Second
DOE	Department of Energy
EDE	Effective Dose Equivalent
EPA	Environmental Protection Agency
ER	Environmental Restoration
HASP	Health and Safety Plan
IHSS	Individual Hazardous Substance Site
JHA	Job Hazard Analysis
K-H	Kaiser Hill Company LLC
LDR	Land Disposal Restrictions
mg/kg	milligram per kilogram
mg/l	milligram per liter
Mrem	millirem
mrem/yr	millirem/year
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollution Discharge Elimination System
PAM	Proposed Action Memorandum
pCi/g	picoCurie per gram
pCi/l	picoCurie per liter
PPE	Personal Protective Equipment
RACT	Reasonably Available Control Technologies
RFA	Rocky Flats Alluvium
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
SWWB	Site Wide Water Balance
TU	Temporary Unit
µg/l	microgram per liter
VOC	Volatile Organic Compound

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1.0 PURPOSE

This Proposed Action Memorandum (PAM) describes the strategy for the collection of potentially contaminated groundwater associated with the 771/774 project area The proposed action will consist of constructing a subsurface groundwater collection system The PAM is the decision document for this action and requires approval by the Colorado Department of Public Health and Environment (CDPHE), as Lead Regulatory Agency LRA under the Rocky Flats Cleanup Agreement (RFCA) (DOE 1996)

In accordance with RFCA Paragraph 106, a PAM shall contain a brief summary of data for the site, a description of the proposed action, an explanation of how waste management considerations will be addressed, an explanation of how the proposed action relates to any long-term remedial action objectives, all applicable or relevant and appropriate requirements, and an implementation schedule and completion date for the proposed action This section in RFCA also requires that the PAM address proposed performance standards This PAM only addresses the subsurface groundwater collection system The treatment system and associated performance standards, if required, for this area will be addressed in the Industrial Area Groundwater Interim Measure/Interim Remedial Action document (in preparation)

This PAM also satisfies the commitment made in the major modification to the 771 Decommissioning Operations Plan, Modification 5 (DOP) The responsiveness summary indicated, "The groundwater management system and modification to the facility to control groundwater (holes in the superstructure and/or maintaining or disrupting the footer drains) will be dictated by the final land configuration and groundwater modeling If these activities are to control contaminated groundwater, the details will be documented in a project-specific RFCA decision document, which would require a formal public comment period If these activities are to control groundwater to minimize erosion and maintain the stability of the area, the details will be documented in work packages and implemented as a best management practice "

The integrated hydrologic modeling indicates that in the event the 771/774 foundation drains fail and there are extreme weather conditions, the carbon tetrachloride plume could travel under the remains of 771/774 and surface north of the facility As a result, this PAM is being prepared to address the construction and installation of the subsurface groundwater collection system before backfilling the 771/774 project area The project has the following objectives

- Intercept groundwater flowing under and through the concrete remains of Building 771/774, to the extent practical
- Intercept groundwater moving west toward the unnamed gully, to the extent practical
- Allow for the installation of a groundwater treatment system, if necessary to protect surface water
- Avoid depletion of waters

This PAM only addresses the installation of the 771/774 groundwater collection system to control potentially contaminated groundwater in the area around Building 771 and 774 An Interim Measures/Interim Remedial Action (IM/IRA) will be prepared for the Industrial Area (IA) groundwater The IM/IRA will include a comprehensive analysis of the IA groundwater, including the area around Buildings 771 and 774 addressed in this PAM The IM/IRA will also include the analysis of whether the water collected by the 771/774

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Groundwater collection system poses an ecological risk or could cause an impact to surface water and requires treatment

2.0 PROJECT DESCRIPTION

This scope of work is for the design and installation of a subsurface groundwater collection system in the north-central portion of the Industrial Area at RFETS A passive subsurface groundwater collection system is anticipated, however a complete evaluation of the integrated hydrologic modeling information and area will be completed prior to initiating the design It is anticipated that the subsurface groundwater collection system will be approximately 875 feet long and extend into the weathered bedrock, which could be 20 to 30 feet below the current ground surface The system shall be designed to allow for the installation of a treatment system after the collection system has been installed, if necessary

Building 771 is located in the north-central section of RFETS The building is predominantly constructed of reinforced concrete with some non-production portions of the building constructed of concrete block and fabricated metal The original building was a two-story structure built into the side of a hill with most of the three sides covered by earth The fourth side, facing the north, provides the main entrance to the building The original building measures 262 feet (north to south) by 282 feet (east to west) on the ground floor and 202 feet by 282 feet on the second floor The building is 31 feet tall, and there are no outside windows in the main building

Building 774 was designed to treat the liquid process wastes generated in Building 771 Building 774 was originally a two-story rectangular structure of poured-in-place concrete By 1989, seven additions had been made to the building, resulting in multiple levels varying from one to four stories in height The additions are constructed of block wall, reinforced concrete, metal-on-metal framing and transite Because of the additions, floor space increased to 25,000 square feet The facility is built on a steeply sloping site The first floor on the north side is 7 5 feet below-grade, and the fourth floor on the south side is 4 feet above-grade

The buildings are being decommissioned in accordance with the 771 Closure Project Decommissioning Operations Plan Modification 5 The DOP requires that the facility be demolished to three feet below final grade, which means portions of the facility will remain below grade

As a result, integrated hydrologic modeling was conducted to determine the effects of leaving a portion of the building in closure configuration over time This modeling had two primary objectives determine the specific hydraulic concerns associated with leaving portions of the building/structure and assess groundwater contaminant transport A localized, high-resolution integrated hydrologic flow model was developed for the area surrounding Building 771, including Building 774 and 771C The purpose of the refined model was to simulate local-scale hydrologic conditions based on proposed closure conditions in the 771 Project area Several hydrologic responses for the closure conditions were evaluated First, the potential for groundwater levels to rise near, or above the ground surface adjacent to structures left in place was evaluated (i e , Buildings 771 and 774 basement wall and slab structures, or the tunnels between Building 776 and 771, or 771 and the stack, respectively) The change in hydraulic and hydrologic conditions between current conditions and closure conditions was also evaluated Finally, potential impacts to the current distribution of subsurface and groundwater carbon tetrachloride (related to IHSS 118 1) were assessed for the assumed closure condition

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The integrated hydrologic modeling indicates that if the 771/774 foundation drains fail and there are extreme weather conditions, the carbon tetrachloride plume could travel under the remains of 771/774 and surface north of the facility Figure 1 depicts the general location of the proposed subsurface groundwater collection system

The subsurface groundwater collection system will be designed with the following performance standards

- Passive system requiring no utilities,
- Collect and manage at least 1 gallon per minute, and
- Minimal maintenance requirements

3.0 BACKGROUND

This section addresses the carbon tetrachloride plume, hydrogeologic setting in the project area and the integrated hydrologic modeling This modeling has been summarized in this document (as it pertains to this document), the complete methodology and results will be included in the Industrial Area Groundwater Interim Measure/Interim Remedial Action document (in preparation)

3 1 IHSS 118 1, Carbon Tetrachloride Plume

The Carbon Tetrachloride Plume is located south of Building 771/774 and extends to the east towards the Solar Ponds area, and to the west towards the drainage west of Building 771 Groundwater flow is primarily towards the north in this area, however, the plume is also believed to be controlled on the northern side by the building foundation drains

The plume is primarily a result of spills during filling a buried 5,000-gallon carbon tetrachloride tank that was located immediately south of Building 771 (IHSS 118 1) The largest spills were a 1,000-gallon spill in the late 1970s and a subsequent 200-300 gallon spill While the tank was removed in 1981, free-phase carbon tetrachloride is present in the subsurface at the former tank location and possibly smaller quantities at other locations A source removal is planned for IHSS 118 1 in Fiscal Year 2005 to coincide with the removal of the 730 facility

3.2 Hydrogeologic Setting

This section presents the hydrogeology of the Industrial Area (IA)

3 2 1 Hydrogeology

The IA is located on a broad, eastward-sloping pediment surface, known as a bench, along the western edge of the Denver Basin (EG&G 1995a) The bench is a nearly flat tongue of land that slopes generally eastward at a low angle from the mountain front. The bench is capped with gravel, specifically the Rocky Flats Alluvium (RFA), which was deposited by streams flowing out of the mountains in the geologic past, when

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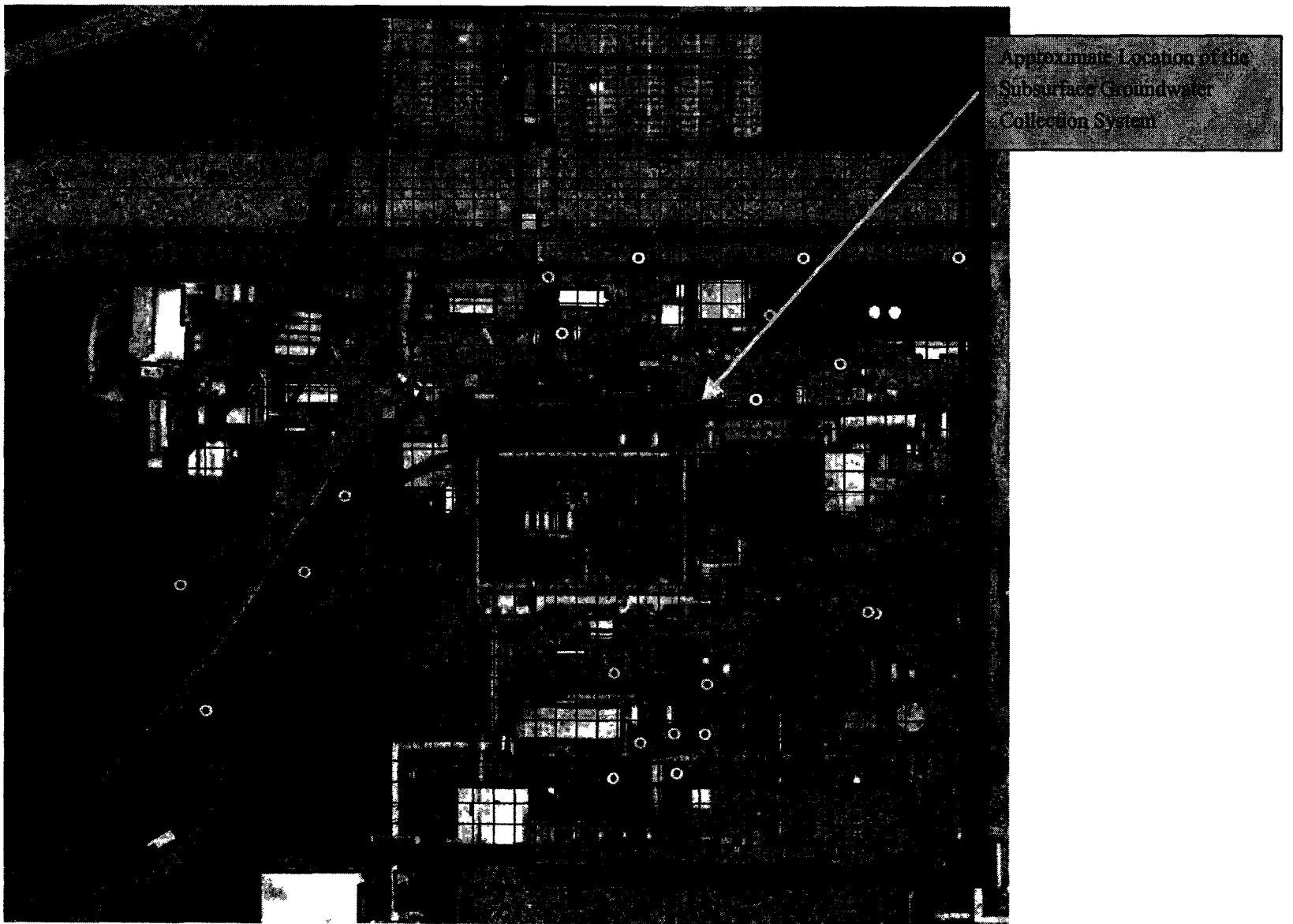
Figure 1 General Location of 771/774 Groundwater Collection System



the bench was the valley floor The bench where the IA resides is separated from benches to the north and south by the North Walnut Creek and Woman Creek drainages, respectively The bench is notched marginally by gullies A large, northeast/southwest trending gully exists in the northwest section of the IA (the west side of and northern portion of Sixth Street) The gully contains artificial fill and valley fill alluvium and groundwater within the drainage discharges to North Walnut Creek (DOE 2002)

The Arapahoe Formation is the bedrock that immediately underlies the RFA in the IA, but it is exposed at the surface where eastward-flowing Woman Creek and North Walnut Creek have eroded the alluvial and bedrock surface The Arapahoe Formation is mainly composed of claystone and silty claystone, with intercalated lenticular sandstone bodies, some of which subcrop beneath the RFA (EG&G 1995a)

The unconsolidated surficial deposits on the bench (RFA) and the weathered portion of the Arapahoe Formation, which extends to approximately 30 feet below the base of the RFA, forms the sequence of materials that have the greatest importance regarding groundwater flow and contaminant transport in the IA This sequence of materials comprises the Upper Hydrostratigraphic Unit (UHSU) Water levels measured in shallow and deep bedrock wells at various locations at RFETS indicated a strong downward vertical hydraulic gradient This suggests that water in the UHSU is likely perched on claystone and silty claystone of the Arapahoe Formation Unconfined groundwater occurs in the UHSU within the RFA and weathered bedrock Seeps are common in the stream drainages at the base of the RFA, and where the Arapahoe Formation sandstones are exposed (EG&G 1995b)

UHSU groundwater recharge occurs from the infiltration of incident precipitation and as base flow from the area upgradient of the IA that extends west to Coal Creek Generally, water levels are highest in spring and early summer and lowest during the winter months In the western portion of the IA, where the thickness of the RFA is approximately 38 feet (well P114989), the depth to the water table is approximately 10 feet and the saturated thickness is approximately 11 feet (DOE 2002) The depth to water generally becomes shallower and the saturated thickness becomes thinner from west to east across the IA as the alluvial material thins, and the underlying claystones are closer to the ground surface

3 2 2 Potentiometric Surface

Potentiometric surface maps of the IA were constructed from water level data collected during the second and fourth quarters (April and October data, respectively) of 2001 (DOE 2002) The data utilized to construct the maps are from unconsolidated surficial deposits (RFA) and selected weathered bedrock components comprising the UHSU Potentiometric contour refinements were made with respect to building foundation drain elevations Information on seep areas was added from the 1995 Hydrogeologic Characterization Report (EG&G 1995)

Unconfined groundwater flows within the UHSU materials, principally the RFA, from west to east, with local flow direction variations toward the drainages and paleotopographic lows, i e , groundwater flow is largely controlled by the topography of the bedrock surface In the north, IA groundwater in the UHSU flows either to the northeast/southwest trending unnamed gully or to the north toward North Walnut Creek Groundwater in the south flows toward Woman Creek In these areas, groundwater flow is in the weathered bedrock Unsaturated alluvial areas exist in the north-central and northeast IA UHSU groundwater in the IA discharges

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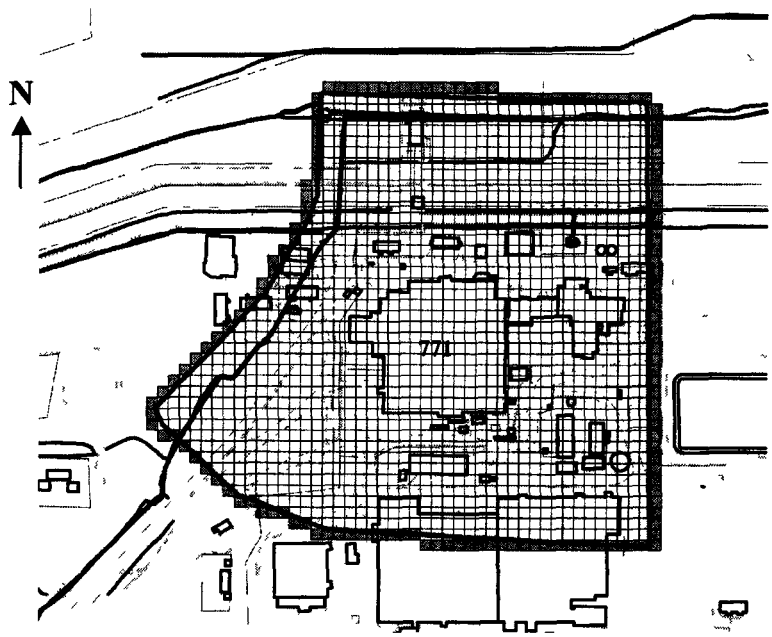
at seeps or as interflow in North Walnut Creek and Woman Creek Base flow of some of the stream reaches is partially sustained by this groundwater discharge

Plant operations appear to have locally impacted groundwater flow patterns in areas where potentiometric contours deviate from ground-surface topographic and/or bedrock surface topographic configurations The presence of irregular potentiometric contours suggests that the groundwater surface has been influenced by the presence of subsurface barriers, sinks, such as building foundation drains, deep storm drains, excavations, buried utility corridors, and extensive paved areas

3.3 Integrated Hydrologic Modeling

Integrated hydrologic modeling was conducted to determine the effects of leaving the 771/774 structure in place over time This modeling had two primary objectives determine the specific hydraulic concerns associated with leaving portions of the building/structure and assess contaminant transport A localized, high-resolution integrated flow model was developed for the area surrounding Building 771, including Buildings 774 and 771C The purpose of the refined model was to simulate local-scale hydrologic and hydraulic conditions based on proposed closure conditions in the 771 Project area The groundwater area of interest for this project that was used for the modeling effort is depicted in Figure 2

Figure 2. 771/774 Groundwater Area of Interest



Several hydraulic responses for the closure conditions were evaluated First, the potential for groundwater levels to rise near, or above the ground surface adjacent to structures left in place was evaluated (i e , Buildings 771 and 774 basement wall and slab structures, or the tunnels between Building 776 and 771, or 771 and the stack, respectively) The change in hydraulic conditions between current conditions and closure conditions

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was also evaluated Finally, potential impacts to the current distribution of carbon tetrachloride (IHSS 118 1) were assessed for the proposed closure condition

The hydraulic response in the project area is complex Saturated zone flows in the vicinity are three-dimensional and complicated by several factors including the building remains, an engineered gravel layer beneath building slabs 771 and 774, occurrence of Arapahoe Sandstone, and hillslope morphology Given the complexity of the objectives, subsurface flow conditions, and the strong surface-subsurface flow interactions, the integrated code, MIKE SHE, used in the Site-Wide Water Balance (SWWB) modeling (KH, 2002), was used to simulate closure conditions and to evaluate the three key hydraulic responses

The integrated modeling approach was iterative and involved several steps to evaluate key responses An integrated model of the current system configuration (water year [WY] 2000) was developed because it was necessary to obtain a base set of flow conditions that could be used to assess the change in system response due to closure in the 771/774 project area It was also necessary to determine whether model flow parameter values needed adjustment due to the grid scale refinement (i e , drain leakage coefficients) At the start of modeling, it was uncertain whether drains needed to be included, or eliminated from future simulations so they were included in the model input algorithm

To a large extent, the same input information used in the SWWB model (KH, 2002) was used to develop the local scale 771/774 project area model One exception was the number of saturated zone layers Seven layers were needed in the refined model, rather than four in the SWWB model, to more accurately define the subsurface structures in the area For example, the tunnel from Building 771 to 776, the material above the remaining building slab, the building walls and the gravel layer underlying the slab were explicitly defined in the saturated zone portion of the model in addition to the spatially variable unconsolidated material and weathered bedrock The weathered bedrock definition included both the claystone/siltstone matrix and the sub-cropping and embedded Arapahoe Sandstone distribution The resolution of the new model is a 25 feet by 25 feet, compared to 200 feet by 200 feet in the regional SWWB model

Only a few simulations of the current configuration were required to obtain a reasonable comparison between simulated and observed hydraulic response Average annual groundwater levels from available wells in the area were compared against simulated average annual groundwater levels In general, simulated groundwater levels were well within a meter of observed values Average annual discharge estimates from foundation drains were also compared against simulated values and found to be within 10 to 20 percent of reported values

Proposed closure configuration modifications recorded in the model included the following

- Subsurface pipes (storm, sanitary, foundation and water supply) were disrupted
- Utility trenches and utility backfill material were not altered
- The ground surface was regraded based on a topographic surface provided in the recent land configuration design studies
- Impervious material at the ground surface were removed
- Structures less than 3 feet below grade were removed As a result, the northern portions of Buildings 771 and 774 were removed to accommodate the regrade topography In addition, Building 771C was assumed entirely removed

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- Fill material within Buildings 771 and 774 was modeled to be similar to coarse gravel (i e , rubblized concrete)
- Concrete structures left in place below grade had low permeability (water does not readily penetrate the concrete)

Results of the closure configuration simulation for a typical climate (WY2000) indicated that average annual water levels are well below 1 meter below grade Only the area near the northern edge of the remaining Building 771 slab showed groundwater levels near the ground surface As a result, a sensitivity analysis was conducted to further evaluate effects of different parameter values on the hydraulic response in the area

The sensitivity analysis indicated that a wet year (100-year basis) combined with an assumption that no subsurface drains were in operation showed groundwater levels would rise to within a meter of ground surface in an area surrounding Building 771 Results also showed, however, that creating holes in the slab floor would only result in an increased head above the slab of about half a meter Assuming that the Arapahoe Sandstone beneath Building 771 has a hydraulic conductivity similar to the claystone/siltstone matrix the gravel layer underlying the building slabs only resulted in slight increases in head upgradient of Building 771 and 774 walls

Results of a simulation with conservative closure conditions of a wet year climate coupled with no subsurface drains indicated several things First, average annual groundwater levels upgradient of the Building walls left in place increased, but were still 1 meter below ground surface However, for large events during a wet year, results indicate several areas, mostly upgradient and around the southern Building 771 wall, may become saturated at, or near the ground surface Results also indicated that average annual heads increase above ground surface along the northern edge of the slab for Building 771 As a result, a subsurface groundwater collection trench was simulated in the model along the northern edge of the Building 771 and 774 slabs The trench was simulated to intercept flows both above and below the slabs Results of this simulation indicated that groundwater levels at the slab edge are reduced below ground surface in this area

The movement of the carbon tetrachloride plume (IHSS 118 1) south of Building 771 was simulated using an advection-dispersion module (a DHI code) that uses the integrated MIKE SHE flow model results It does not simulate effects of degradation, diffusion, or sorption, but it accounts for most of the plume movement from the assumed source area

Additional simulations were conducted of the 771/774 project area to estimate the proposed trench depth required to control migration of carbon tetrachloride Two additional cases where the trench depth is assumed to be a constant depth of 6 meters and 10 meters below grade were run through the model Results of this modeling indicated that the VOC plume is still not fully captured by a constant trench depth of 6 meters, but a 10-meter depth appears capable of capturing both the northern and western migration adequately Therefore, modeling suggests that a trench needs to be greater than 6 meters, but does not have to be greater than 10 meters Modeling results indicate that total flow rates from the trench would be small (below 1 gallon per minute)

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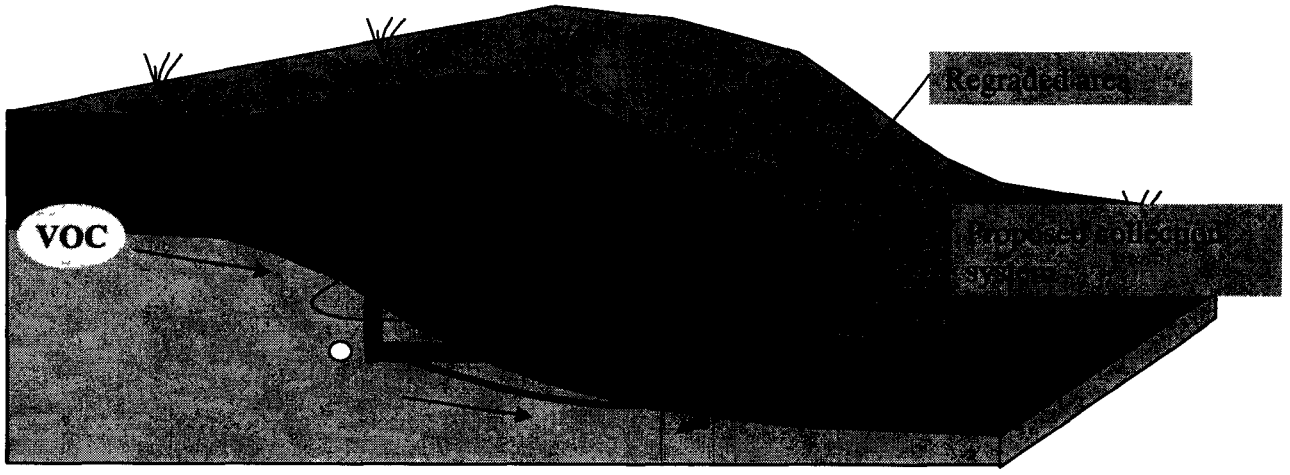
4.0 PROJECT APPROACH

A subsurface groundwater collection system will be installed in the unnamed gully and north of Buildings 771 and 774 to intercept potentially contaminated groundwater The implementation of this PAM is independent of any source removal actions that may be taken at PAC 700-118 1 or other PACs pending investigation results These PACs will be evaluated for accelerated action per ALF Section 4 and the Soil Risk Screen (ALF Figure 3) Of particular note is the ALF Section 4 2A action determination evaluation criterion that states

> "Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering controls (For volatile organic compounds, where VOC contamination levels approach free product concentrations, such as at IHSS 118 1, a combination of contaminated soil source removal and groundwater treatment may be selected as the appropriate accelerated action)"

Source removal is planned for IHSS 118 1 when 730 facility is removed As a result, this facility has been transferred to the Environmental Restoration group from the 776/777/707 Closure Project, documented in Minor Modification 10 of the 776/777 Decommissioning Operations Plan Source removal will be conducted in accordance with the appropriate ER RSOP notification Figure 3 is a profile illustration of the 771 building remains, the carben tetrachloride plume and the proposed collection system

Figure 3. Project Profile



4.1 Proposed Action

The subsurface groundwater collection system will be keyed into the underlying weathered claystone bedrock to collect as much groundwater flow as practical The collected groundwater may be treated in a separate treatment system, if required Based on the available data, the subsurface groundwater collection system will

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extend from the east side of Building 774 to the west side of Building 771 and extending south parallel to the unnamed gully to the south side of Building 771, a distance of 875 feet

4 1 1 Installation of the Collection System

Conventional excavation and/or trenching techniques or a continuous trencher will be used to install the collection system Silt fences will be installed downgradient of the excavation to control potential release of sediment to the drainage During trench construction, the material removed from the trench will be stockpiled adjacent to the trench A horizontal groundwater-collection line will be installed and filter pack will be placed around and several feet above the horizontal collection line The trench will then be backfilled and excess fill will be spread over the top of the collection system

During soil handling and activities that result in dust generation, dust minimization techniques, such as water sprays, will be used to minimize suspension of particulates In addition, excavation operations will not be conducted during periods of sustained high winds The RFETS Environmental Restoration Field Operations Procedure FO 01 - Air Monitoring and Dust Control will be followed

Work will be evaluated during the project to determine whether radiological monitoring is required All monitoring will be in accordance with 10 CFR 835 and the RFETS Radiological Controls Manual (K-H, 1996) If unexpected hazards or conditions are encountered during remediation, work will be halted in order to re-evaluate the existing procedures to ensure that these are safe and appropriate It is anticipated that no contaminated soil or groundwater will be encountered during construction, as a result, no radiological sampling will be required All equipment will be monitored prior to leaving the site Prior to release from RFETS, the equipment will be assessed in accordance with the RFETS Radiological Control Manual (K-H 1996) Excavation equipment will be decontaminated, if necessary Typical decontamination methods include pressure washing and hand washing

4 1 2 Site Reclamation

At the completion of the installation of the subsurface groundwater collection system, the areas disturbed during construction will be backfilled in accordance with the land configuration and revegetated. Revegetation will be in accordance with the Industrial Area Revegetation Plan

4 1 3 Worker Health and Safety

A Site-Specific Health and Safety Plan (HASP) will be developed to address the safety and health hazards of each phase of project operations and to specify the requirements and procedures for employee protection The Occupational Safety and Health Administration construction standard for Hazardous Waste Operations and Emergency Response, 29 Code of Federal Regulations (CFR) 1926 65 will be used as the basis for the HASP In addition, DOE Order 5480 9A, Construction Project Safety and Health Management, applies to this project This order requires preparation of Job Hazard Analyses (JHAs) to identify each task, hazards associated with each task, and controls necessary to eliminate or mitigate the hazards The JHAs will be included in the HASP

This project will expose workers to physical hazards and could potentially expose workers to chemical and radiological hazards The physical hazards include those associated with excavation activities, use of heavy

equipment, noise, heat stress, cold stress, and work on uneven surfaces Physical hazards will be mitigated by appropriate use of personal protective equipment (PPE), engineering, and administrative controls Chemical hazards will be mitigated, if necessary, by the use of PPE and administrative controls Appropriate skin and respiratory PPE will be worn throughout the project, as necessary Routine VOC monitoring will be conducted with an organic vapor monitor for any employees who must work near the contaminated soil (i e , soil sampling or excavation personnel) Based on employee exposure evaluations, the Site Health and Safety Officer may downgrade personal protective equipment requirements, if appropriate

Since this is not a radiological area, continuous radiological controls are not expected to be required However, the HASP will include project "hold points," which will account for unanticipated hazards such as contaminated debris Radiation monitoring will be included as appropriate to meet this approach in the HASP per the RFETS Radiological Controls Manual (K-H, 1996)

If field conditions vary from the planned approach, a JHA will be prepared for the new conditions, and work will proceed according to the appropriate control measures Data and controls will be continually evaluated Field radiological screening will be conducted using radiological instruments appropriate to detect surface contamination and airborne radioactivity As required by 10 CFR 835, Radiation Protection of Occupational Workers, applicable RFETS implementing procedures will be followed to insure protection of the workers, co-located workers, the public, and the environment The HASP will describe the air monitoring equipment and methods to be used to monitor for VOCs, particulates, and radiation Finally, dust minimization techniques will be used to minimize suspension of contaminated soils

4 1 4 Waste Management

When the excavation for the placement of the subsurface groundwater collection system is performed, soil will be stockpiled adjacent to the trench for use as backfill or to regrade or revegetate the area If water accumulates in the trench during excavation and poses a threat to the excavation progress, the water will be collected and dispositioned according to the incidental water program Any associated collected sediment will be segregated, mixed with backfill material to make it more manageable for handling, and returned to the trench

5.0 ENVIRONMENTAL IMPACTS

RFCA mandates incorporation of NEPA values into decision documents such as this PAM (DOE 1996) Accordingly, this section provides a description of potential environmental impacts that may be associated with the installation of a subsurface groundwater collection system in the unnamed gully and north of Buildings 771 and 774 to intercept groundwater

5 1 Soils

Conventional excavation and or trenching techniques are to be used to install the 771/774 groundwater collection system The collection system could be approximately 875 feet long, with a width of 24 inches to 36 inches The collection system will be installed at a variable depth of 20 to 30 feet Surface and subsurface soils will be disturbed for the length and width of the excavation sites The natural soil profile (if present) will be eliminated and replaced by a more homogenous soil mixture when the excavated material is backfilled into

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the trench Backfilling of the excavations could affect the ability of the disturbed area to support revegetation unless suitable topsoil is used Topsoil (if present) will be segregated at the start of the excavation for later use in accordance with Site revegetation procedures

Because excavated and in-place soils could be carried off by storm water during the project, best management practices such as the downgradient installation of silt fences and hay bales will be used at the work site to prevent the transport of sediment during construction Revegetation will provide erosion control after installation is complete

Analysis of subsurface soil samples in the proposed construction area revealed VOCs, metals, and radionuclides below detection limits Radiological monitoring of the soil will not be performed unless it is required to protect workers, the public, and the environment in accordance with 10 CFR 835 and the RFETS Radiological Controls Manual During excavation, soils will be stockpiled adjacent to the trench or benched within the excavation for eventual use as backfill All excavated soils will be returned to the excavation during backfill operations

5 2 Air Quality

Project activities potentially could generate criteria air pollutants and radionuclides The criteria pollutant of greatest concern is dust, specifically particulate matter less than ten microns in size (PM10) An air quality analysis will be performed to assure compliance with applicable air quality regulations The analysis, along with other project information, will identify appropriate measures to take to protect the health of workers and the public Such measures, if necessary, will be identified in the project's HASP

Dust from construction will be the primary non-radiological air emission The Colorado Air Quality Control Commission requires that practical, economically reasonable, and technologically feasible work practices be used to control emissions Techniques such as using water sprays and stopping work during high wind periods (typically winds exceeding 15 mph) will be used When fossil fuel fired generators or other portable equipment are needed, opacity standards (20 percent) will be met and fuel usage tracked for the duration of the project Heavy equipment (e g , trenchers, bulldozers, front-end loaders and dump trucks) will be used The impact from heavy equipment and from the construction of the trench itself are short-term and with the use of proper dust suppression techniques, controllable

Radiological concerns could also be associated with dust emissions generated during the soil disturbance 40 CFR 61, Subpart H, requires continuous air monitoring and regulatory notification for any source with the potential to emit radionuclides that could contribute more than 0 1 millirem (mrem) per yea effective dose equivalent (EDE) to the most impacted member of the public Based on sampling, the soils to be excavated contain very low concentrations of radionuclides Due to the low potential of radionuclide emissions, air monitoring and regulatory notification thresholds are not anticipated to be exceeded

Because regulatory requirements and health-based standards will be met, no adverse effects to air quality are expected There will be no impact to workers or the public from project-related air emissions

5 3 Water Quality

Water quality, during construction of the system, could also be adversely affected by sedimentation However, silt fences will be used to prevent eroded soils from reaching North Walnut Creek As a result, water quality impacts are anticipated to be negligible

5 4 Human Health and Safety

The implementation of this project could expose workers to physical, chemical and low-level radiological hazards As discussed in Section 4 1 3, these hazards will be considered and controlled during all phases of the project The use of controls and procedures for worker protection will also protect the public, since work control measures are designed to identify potential hazards and prevent releases of all types (e g , dust control and decontamination of excavation equipment) As a result, human health and safety impacts are anticipated to be negligible

5 5 Ecological Resources

The project will disturb up to 20 acres, during construction of the collection system, however, all of the area will be disturbed during the 771/774 decommissioning and restoration activity regardless of the subsurface groundwater collection system installation No wetlands will be disturbed The disturbed area lies in the northeast/southwest unnamed gully, which has been backfilled with artificial fill Thus the area is already heavily disturbed The impact of project construction will be temporary, and the disturbed area will be revegetated with native vegetation as directed by Site ecologists

None of the area to be disturbed by the remediation activities supports or provides habitat for threatened or endangered plant or animal species or species of concern, nor does it contain unique or unusual biological resources

5.6 Historic Resources

The Rocky Flats Plant site was placed on the National Register of Historic Places as a Historic District (5JF1227) on May 19, 1997 Historic District designation mandates compliance with the Historic Preservation Act of 1966 and with the terms of the agreement established with the Colorado State Historical Preservation Office The subsurface groundwater collection system lies within the boundaries of the Historic District, however, no impact is expected to occur to protected structures In the unlikely event that potentially historic artifacts are encountered, appropriate site procedures will be implemented

5 7 Visual Resources

Project activities will result in temporary, moderate visual impacts while construction of the project is in progress This appearance will not, however, be in sharp contrast to the industrial buildings and activities at the RFETS Furthermore, construction activities are expected to last no more than three months Following revegetation, the majority of the area will return to its former appearance as an access road The subsurface groundwater collection system will be passive, so no power lines will be required As a result, visual resource impacts are anticipated to be negligible

5.8 Noise

Construction and remediation activities will result in a minor increase in local noise levels at the construction site that are consistent with highway construction and excavation activities Such impacts will be minor, temporary, and consistent with other noise levels at the Site Noise generated by the project will not be noticeable more than a few hundred yards from the area and will be confined to the Site Appropriate hearing protection will be supplied for project personnel as identified in the project's HASP No noise will emanate from the collection system during operation, and therefore the noise impacts of the project will be limited to the construction period

5 9 Cumulative Effects

In general, the adverse effects of the 771/774 groundwater collection system activities are expected to be minimal and temporary Beneficial effects, including the control of potentially contaminated groundwater and reintroduction of native species during revegetation, will be long-term The cumulative effects of this broader, Site-wide effort are described in the Cumulative Impacts Document, (DOE 1997) That document describes the short- and long-term effects from the overall site clean up mission

5 10 Unavoidable Adverse Impacts

Some temporary, adverse effects will necessarily occur because of the project activities For example, some mammals or reptiles may be temporarily dislocated Noise levels will increase slightly but temporarily Fuels and other resources will be consumed and minor quantities of air pollutants will be released to the atmosphere

5 11 Short-term Versus Long-term Productivity

The project area will not impact grassland because all of the project area is previously disturbed and industrialized Overall, project activities will improve the long term stability of the area and allow groundwater treatment, if necessary, which in turn will better support both wildlife and vegetation, and will create the potential for other, possibly more productive uses after the Site closes

5.12 Irreversible and Irretrievable Commitments of Resources

This project will irretrievably consume fuels, money and labor resources, along with small quantities of certain materials used in the collection the groundwater However, none of these resources will be consumed in quantities that are significant relative to their consumption elsewhere across the Site

6.0 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

RFETS accelerated actions performed under a PAM must attain, to the maximum extent practicable, federal and state applicable or relevant and appropriate requirements (ARARs) For that reason, the substantive attributes of the federal and state ARARs have been identified Section 121(e)(1) of Comprehensive Environmental Response Compensation and Liability Act (CERCLA) waives the procedural requirement to obtain federal, state, or local permits (RFCA ¶16 a) However, for each permit waived, RFCA requires identification of the substantive requirements that would have been imposed in the permit process (RFCA ¶17)

Further, the method used to attain the substantive permit requirements must be explained (RFCA ¶17 c) The following discussion is intended to compliment other portions of this PAM in a manner that satisfies the RFCA permit waiver requirements

ARARs are identified as chemical-, location-, or action-specific Chemical-specific requirements are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the ambient environment Location-specific requirements are restrictions placed on the concentration of hazardous substances solely because they occur in special locations Typical location restrictions are for areas with sensitive or unique characteristics such as wetlands, areas of historical significance, or areas situated in locations requiring special precautions Action-specific requirements are usually technology- or activity-based requirements or limitations on actions taken with respect to management of the remediation waste or closure of the facility These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy The ARARs identified and discussed in the following sections are the chemical, location and action specific requirements to be considered for this action

6.1 Chemical-Specific Requirements and Considerations

6 1 1 National Emissions Standards for Hazardous Air Pollutants (NESHAP)

Title 40 of the Code of Federal Regulations (CFR) Part 61, Subparts A and H (CCR 5 1001-3, Regulation No 8, Part A, Subparts A and H) contain the applicable NESHAPs This regulation requires limiting RFETS radionuclide emissions to meet an annual public dose standard (to offsite member of the public) of 10 millirem (mrem), monitoring significant emissions points, notifying EPA and the CDPHE and obtaining approval (state permit) prior to construction or modification of radionuclide sources with emissions exceeding a 0 1 mrem threshold, and annual reporting of the RFETS Effective Dose Equivalent for each calendar year to demonstrate compliance with the 10 mrem standard

Due to low concentrations of radionuclides in groundwater, surface and subsurface soils, and because the proposed remediation is a CERCLA project, EPA/CDPHE notification and approval are not required The estimated dose from the project is not expected to exceed the 0 1 mrem monitoring threshold (see 40 CFR §61 93 (b)(4)(i)) Records will be kept, as needed, of project parameters sufficient to estimate the dose for annual compliance reporting

6 2 Action-Specific Requirements and Considerations

Action-specific requirements and considerations were evaluated specific to the following subsurface groundwater collection system proposed action elements

- Disposition of Remediation Waste
- Disposition of Construction Waters
- Soil Staging
- Use of Tanks and Containers
- Particulate, VOC and Hazardous Air Pollution Emissions

- Debris Treatment

6 2 1 Disposition of Remediation Waste

In RFCA remediation waste is defined as all

(1) Solid, hazardous, and mixed wastes,

(2) All media and debris that contain hazardous substances, listed hazardous or mixed wastes or that exhibit a hazardous characteristic, and

(3) All hazardous substances generated from activities regulated under this Agreement as CERCLA response action (See RFCA ¶25 bf)

A parallel definition is also found in 40 CFR §260 10 As such, the definition of remediation waste is applicable to all wastes, environmental media (soil, groundwater, surface water, storm water and air) and debris generated in conjunction with this action Requirements governing the identification and listing of hazardous wastes are applicable to generation of remediation waste (See 40 CFR Part 261)

6 2 2 Disposition of Construction Waters

Wastewaters generated during construction activities will be collected and dispositioned according to the incidental water program Treatment is not anticipated to be required based on available data If the water requires treatment, it will be transferred to the Consolidated Water Treatment Facility at B891 for treatment (Code assigned would be U211) The Consolidated Water Treatment Facility will treat the remediation wastewater to meet applicable surface water quality standards under the ARARs framework

Any waste generated at the Consolidated Water Treatment Facility as the result of treatment of a listed remediation waste or wastewater will be assigned the hazardous waste code and managed in accordance with applicable waste requirements in accordance with the Consolidated Water Treatment Facility RFCA Standard Operating Protocol

6 2 3 Soil Staging

The movement, temporary staging and replacement of excavated soils containing hazardous wastes will not trigger LDRs (see 55 FR 8760) as long as these activities occur within the same area of concern

As noted earlier, uncontaminated or marginally contaminated soils that are excavated when the system is installed will be stockpiled adjacent to or benched within the excavation Consistent with the General Stormwater Permit for Constructions activities, BMPs to control erosion will be implemented, i e use of silt fences or hay bales per the Site Stormwater Pollution Prevention Plan

6 2 4 Use of Tanks and Containers

Tanks and containers may be used during construction and startup to contain groundwater that may seep into the construction area This requires the establishment of RFCA Temporary Units (TUs) for remediation waste, which will be maintained per the substantive requirements of RCRA as an ARAR

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6 2 5 Air Pollutant Emissions (Particulates, Volatile Organic Compounds, Hazardous Air Pollutants)

Soil excavation activities for this project have the potential to generate radioparticulate and fugitive dust emissions Radionuclide air pollutant emissions are regulated by 40 CFR 61, Subpart H (Radionuclide-NESHAP) and 5 CCR 1001-3 Regulation No 8

Fugitive particulate emissions will be generated during construction activities Estimated emissions are below air emission inventory reporting thresholds and are based on the volume of soil to be excavated, stockpiled, and backfilled 5 CCR 1001-10, Regulation No 8 requires the implementation of practical, economically reasonable, and technologically feasible work practices to control particulate emissions During soil handling activities, dust minimization techniques such as water sprays, will be used to minimize suspension of particulates In addition, earth-moving operations will not be conducted during periods of high wind The substantive requirements of a control plan (Regulation No 1, Section III D) will be included in project documentation In addition, RFETS Environmental Restoration Field Operations Procedure FO 1, Air Monitoring and Particulate Control, requirements will be incorporated into project operations

5 CCR 1001-9, Regulation No 7, regulates VOC emissions Regulation No 7, Section II requires new sources of VOC utilize Reasonably Available Control Technologies (RACT) VOCs may be emitted during soil excavation. Although significant VOC concentrations are not expected, a bounding assumption has been made that less than 1 ton of VOCs will be emitted from excavation and soil handling activities Based on this assumption, RACT will be attained without implementing specific VOC controls for soil excavation, staging and replacement (See Statement of Basis and Purpose, Regulation No 3, Part D, July 15, 1993)

Regulation No 7, Section III governs the transfer and storage of VOCs and requires bottom or submerged fill for containers greater than 56 gallons CDPHE has previously given guidance that any liquid containing any amount of an organic compound may be considered a VOC for purposes of this requirement This requirement is applicable to containers and tanks larger than 56 gallons used to dewater the excavation or used to manage decontamination water To the maximum extent practicable, storage tanks and related equipment will be maintained to prevent detectable vapor loss

5 CCR 1001-5 Regulation No 3, provides authority to CDPHE to inventory air pollutant emissions Part A, Section II of this regulation requires the submittal of Air Pollution Emission Notices (APENs) to CDPHE prior to installation of the subsurface groundwater collection system project if regulatory inventory thresholds are exceeded Based on conservative assumptions concerning soil-contaminant concentrations and project parameters, estimated potential emissions will not exceed inventory-reporting thresholds, so APENs do not need to be submitted to CDPHE

Project operations may require limited use of fossil fuel fired generators or other portable equipment The potential combustion-product emissions from temporary use of these units will not exceed APEN inventory reporting thresholds All fossil fuel fired units will meet the 20% opacity standard set forth in 5 CCR 1001-3, Section II

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6 2 6 Debris Treatment

During construction activities, materials may be encountered or debris generated, which may contain listed hazardous waste Any solid residues from debris treatment exhibiting a hazardous waste characteristic will also be managed in accordance with RCRA hazardous waste requirements

Liquid residues from the treatment of debris containing listed hazardous wastes will be collected and transferred to the Consolidated Water Treatment Facility Residues that result from the treatment of listed debris will carry the same listing as the listed debris from which it originated Any Consolidated Water Treatment Facility residues exhibiting a hazardous waste characteristic will also be managed in accordance with RCRA hazardous waste ARARs

6.3 Location Specific Requirements and Considerations

There are no location specific requirements and considerations for this project

7.0 IMPLEMENTATION SCHEDULE

Installation of the 771/774 groundwater collection system is scheduled to commence during spring 2004 Any delays, scope, or budget changes may affect this schedule The 771/774 groundwater collection system is expected to be the long-term remedy The system is expected to function as long as it is required to meet the original objectives

8.0 RECORDS DISPOSITION

The 771/774 Groundwater Collection System Project records consist of the CERCLA AR File and Environmental Restoration Project Files

8 1 CERCLA Administrative Record File

This section identifies the documents that constitute the AR File for the 771/774 Groundwater Collection System Upon completion of the public comment period, comments received from the public will be added to the AR File, along with the responsiveness summary and the LRA approval letter LRA approval of this PAM and associated constitutes approval of the AR File The following documents will be added to the 771 Closure Project AR for this modification

- Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, CO 2003
- 771 Closure Project Decommissioning Operations Plan, Modification 5, August 8, 2003
- Rocky Flats Environmental Technology Site, Site Wide Water Balance
- *Geologic Characterization Report for the Rocky Flats Environmental Technology Site,* 1995
- *Hydrogeologic Characterization Report for the Rocky Flats Environmental Technology Site,* 1995
- Rocky Flats Environmental Technology Site, 2003, Industrial Area Revegetation Plan, Revision 1, May

- Cumulative Impacts Document, Rocky Flats Field Office, Golden, Colorado, June 1997
- Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, CO 1992

The following information repositories have been established to provide public access to the 771/774 Groundwater Collection System AR

Colorado Department of Public Health and Environment (CDPHE)
Information Center, Building A
4300 Cherry Creek Drive South
Denver, Colorado 80220-1530
(303) 692-3312

U S Department of Energy Rocky Flats Public Reading Room
Front Range Community College Library
3645 West 112th Avenue, Level B
Westminster, Colorado 80030
(303) 469-4435

U S Environmental Protection Agency (EPA)
Region VIII
Superfund Records Center
999 18th Street, Suite 500
Denver, Colorado 80202-2466
(303) 293-1807

8.2 Environmental Restoration Project Files

Project-specific documents will be stored in the Environmental Restoration Project Files until the project is complete, at which time the Environmental Restoration Project Files will be processed through Site Records Management and archived The Environmental Restoration Project Files will contain characterization documentation, inventory sheets, project correspondence, comment resolution, work packages, and additional information that is a direct result of the work involved in the project Maintenance of the Environmental Restoration Project Files is a Site requirement

9 0 COMMENT RESPONSIVENESS SUMMARY

This section will be completed after the public comment period